

ABSTRACT OF THE DISCLOSURE

Free-space optical transceivers employ wavelength conversion from a fiber interface wavelength λ_{fiber} to a free-space transform wavelength λ_{fs} and back again to overcome a broad range of environmental impacts to the free-space optical signal, such as fog. The wavelength conversions may be performed all-optically without the need for electro-optical conversion, or the wavelength conversions may be performed using electro-optical conversion. The performance of the chosen value for the free-space transform wavelength λ_{fs} may be monitored and a feedback control system used to dynamically adjust the value for λ_{fs} until the optimum value for the given atmospheric conditions is achieved. Cooperating transceivers can be informed of a newly selected value for λ_{fs} via a direct, out-of-band control communications channel, or cooperating transceivers can determine the appropriate wavelength transform amount to be applied by an adaptive wavelength selection determination.